PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)* see form PCT/ISA/210 (second sheet)	
Applicant's or agent's file reference see form PCT/ISA/220	**FOR FURTHER ACTION** See paragraph 2 below
International application No. PCT/IB2004/052203	International filing date *(day/month/year)* 26.10.2004
Priority date *(day/month/year)* 31.10.2003	
International Patent Classification (IPC) or both national classification and IPC B81B3/00	
Applicant KONINKLIJKE PHILIPS ELECTRONICS N.V.	

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IB2004/052203

Box No. I· Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 3, 5-7, 9, 10

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination *(specify)*:

☐ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the whole application or for said claims Nos. 3, 5-7, 9, 10

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form	☐	has not been furnished
	☐	does not comply with the standard
the computer readable form	☐	has not been furnished
	☐	does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

   ☐ paid additional fees.

   ☐ paid additional fees under protest.

   ☒ not paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☐ all parts.

   ☒ the parts relating to claims Nos. 1,2,4,8,11

Box No. V Reasoned statement under Rule 43*bis*.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1,2,4,8,11 (no)
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1,2,4,8,11 (no)
Industrial applicability (IA)	Yes:	Claims	1,2,4,8,11
	No:	Claims	

2. Citations and explanations

   see separate sheet

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

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Box No. VI Certain documents cited

1. Certain published documents (Rules 43*bis*.1 and 70.10)

   and / or

2. Non-written disclosures (Rules 43*bis*.1 and 70.9)

   see form 210

1 Reference is made to the following documents:

D1: WO 03/078299 A (ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE; IONESCU, MIHAI, ADRIAN ET AL) 25 September 2003 (2003-09-25)

D2: WO 03/055789 A (SONY CORPORATION; IKEDA, KOICHI; KINOSHITA, TAKASHI) 10 July 2003 (2003-07-10)

D2': US 2004/077119 (IKEDA K ET AL) 22 April 2004

D3: FRITSCHI R ET AL: "A novel RF MEMS technological platform" IECON-2002. PROCEEDINGS OF THE 28TH. ANNUAL CONFERENCE OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY. SEVILLA, SPAIN, NOV. 5 - 8, 2002, ANNUAL CONFERENCE OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY, NEW YORK, NY : IEEE, US, vol. VOL. 1 OF 4. CONF. 28, 5 November 2002 (2002-11-05), pages 3052-3056, XP010707678 ISBN: 0-7803-7474-6

D4: CHANG C ET AL: "Innovative micromachined microwave switch with very low insertion loss" SENSORS AND ACTUATORS A, ELSEVIER SEQUOIA S.A., LAUSANNE, CH, vol. 79, no. 1, January 2000 (2000-01), pages 71-75, XP004185127 ISSN: 0924-4247

Document D2' belongs to the same patent family as D2 and is considered to disclose the same subject-matter.

Re Item IV.

2 The separate inventions/groups of inventions are:

I. Method and device comprising a fluorine chemistry inert etch stop layer (claims 1,2,4,8,11)

II. Integrated thin-film capacitor (claim 3)

III. Etching in CFy plasma (claim 5)

IV. Etching of two sacrificial layers in one step (claims 6,7)

V. GroupIVn-oxide etch stop layer (claims 9,10)

They are not so linked as to form a single general inventive concept as required by Article 3(4)(iii) PCT and Rule 13 PCT for the following reasons:

The subject-matter of independent claims 1 and 8 is already known, see the grounds for this objection under Item V.

The requisite unity of invention (Rule 13.1 PCT) therefore no longer exists inasmuch as a technical relationship involving one or more of the same or corresponding special technical features in the sense of Rule 13.2 PCT does not exist between the subject-matter of the dependent claims which directly depend on one of independent claims 1 and 8.

Examining the possible correspondence by technical effect, one finds the following technical effects:

I. Problem solved by the first invention, defined by claim 2: the use of the prior-art polymer is problematic, see the description of the present application, page 3, lines 16-31. The problem is solved by the technical feature of claim 2, in that an anorganic material is used. Claims 4 and 11 depend directly on claim 1 and are formally non-unitary as well. The technical features of claims 4 and 11 are, however, considered trivial and the claims have hence be grouped with the first invention.

II. Problem solved by the second invention, defined by claim 3: how to form a thin-film capacitor simultaneously with the MEMS device. Solved by using the sacrificial layer of the MEMS device as dielectric of the capacitor.

III. Problem solved by the third invention, defined by claim 5: how to provide an etchant with isotropic behaviour, see the description of the present application, page 5, lines 31-32, solved by etching in CFy plasma.

IV. Problem solved by the fourth invention, defined by claims 6 and 7: how to fabricate more advanced designs of MEMS elements, see the description of the

present application, page 6, lines 19-25, solved by providing a second sacrificial layer and removing the two sacrificial layers in one step.

V. Problem solved by the fifth invention, defined by claims 9 and 10: how to provide a good etch stop layer, solved by choosing an GroupIVn-oxide material.

This shows lack of corresponding technical effect. Consequently, neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions, which involves a single general inventive concept.

In conclusion, the groups of claims are not linked by common or corresponding special technical features and define 5 different inventions not linked by a single general inventive concept.
The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V
Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

3 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claim 1 is not new in the sense of Article 33(2) PCT.
The document D1 discloses a method of manufacturing an electronic device comprising a micro- electromechanical systems (MEMS) element, which MEMS element comprises a first and a second electrode, which second electrode is movable towards and from the first electrode (see D1, page 15, line 23 and figures 7.1-7.10), which method comprises the steps of:
- providing an etch stop layer of electrically insulating material at a first side of a substrate (D1, any of layer 02 in figure 7.1 and layer 04 in figure 7.4);
- providing a base layer (D1, layer 03 in figure 7.2) of an electrically conductive material at the first side of the substrate, in which base layer the first electrode is

6 Dependent claims 2, 4 and 11 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty, see document D1 and the corresponding passages cited in the search report.